Making Patterns, Breaking Patterns – Applying ethnographic system mapping and analysis to support your group's culture

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Courtney Faber, Ph.D., is an Assistant Professor of Engineering Education at University at Buffalo. Her research focuses on empowering engineering education scholars to be more effective at impacting transformational change in engineering and developing educational experiences that consider epistemic cognition. She develops and uses innovative research methods that allow for deep investigations of constructs such as epistemic thinking, identity, and agency. Dr. Faber has a B.S. in Bioengineering and a Ph.D. in Engineering and Science Education from Clemson University and a M.S. in Biomedical Engineering from Cornell University. Among other awards for her research, she was awarded a National Science Foundation CAREER Award in 2022 to study epistemic negotiations on interdisciplinary engineering education research teams.

Lorna Treffert, University at Buffalo

Lorna Treffert is a 1st year Ph.D. student in the engineering education department at the University at Buffalo . She holds both a BS and MS in Industrial and Systems Engineering. Her research interests include facilitating diversity and inclusion within engineering education, epistemologies in engineering education research culture, and applications of operations research in an education context.

Workshop 1 – Making Patterns, Breaking Patterns – Ethnographic systems mapping and analysis of engineering education groups

Systems thinking is an essential skill for engineers in an increasingly complex world. Engineers must be able to see beyond applied science and mathematics to the social, political, economic, ethical, environmental, and even interpersonal forces acting on any problem in order to arrive at optimal solutions. As we endeavor to "expand student success" by helping them develop these skills, it seems only natural that engineering educators use the same paradigm to evaluate their own group, classroom, and departmental cultures. A system, as defined by renowned environmental scientist and systems scholar Donella H. Meadows is, "A set of things: people, cells, molecules, or whatever – interconnected in such a way that they produce their own pattern of behavior over time". If we treat a group's culture as a complex system, it becomes simple and effective to use tools from systems thinking (system maps and causal loops) and ethnography (descriptive observations, language identification, and domain analysis) to identify helpful and harmful patterns in a group's function.

In this workshop, we combine approaches from systems thinking and ethnography, namely Spradley's Developmental Research Sequence for participant observation, to guide participants through the development of a culture map. Participants will select a group or social situation they are a part of to construct their own culture maps. These maps could represent a team, a classroom, a student society, a department, or a number of other scenarios relevant to educators of first-year engineering students. To construct these maps, participants will take into account the functions, goals, values, languages, activities, actors, and their interactions which constitute their group culture. Then participants will use these culture maps as a tool to identify areas of strength, weakness, and risk within their groups. This workshop is applicable to any researcher or faculty member looking to reflect on and improve the culture of their team, classroom, department, or other chosen scenario.

Outcomes for Participants:

1) Development of a culture map for a self-selected social situation or group through guided reflection and use of approaches from systems thinking and ethnography.
2) Identification of the strengths, weaknesses, and risks for the self-selected social situation or group.
3) Identification of ways to capitalize on strengths and mitigate weaknesses/risks
4) List of 3 takeaways from the workshop and how they hope to implement/use these takeaways.

Timeline:

Minute 0 to 5 – Welcome and Introductions

Minute 5 to 20 – Introduction to systems thinking and ethnographic tools. Participants will have a guided note sheet to facilitate note taking during this part of the session. This direct instruction will help provide participants with the tools and understanding they need to construct their own culture maps. As part of this instruction, the facilitators will give an example culture map.

Minute 20 to 40 – Development of a culture map for a select group or social scenario determined by each workshop participant. Participants will be guided through this process by the workshop facilitators who will pose a series of questions. The facilitators will circulate as participants work to construct their maps to provide feedback and answer any questions. Participants will develop their maps on poster sized sticky notes.

Minute 40 to 55 - Identification of strengths, weaknesses, and risks for the selected group or social situation. Participants will be guided through this process by a series of questions that will help them think through possible strengths, weaknesses, and risks. As part of this process, participants will pose questions that they hope to get feedback on from other workshop participants. As the participants work through the questions, the workshop facilitators will circulate and answer any specific questions.

Minute 55 to 75 – Share culture maps in a poster session style format; participants will be given sticky notes and will circulate through all of the maps providing feedback and questions on the sticky notes

Minute 75 to 85 – Group reflection on observations from seeing other culture maps and strengths/weaknesses/risks; Individual revision of map based on takeaways from other maps and/or identification of ways to capitalize on strengths and mitigate weaknesses/risks – this will be done through guided reflection questions. During this segment, facilitator will also guide participants to identify their top 3 takeaways from the workshop and how they hope to implement/use these takeaways.

Minute 85 to 90 – Final group reflection and wrap-up.